CLINICAL EVALUATION OF HEADACHE IN PATIENTS WITH EPILEPSY

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CERTIFICATE

This is to certify that the dissertation entitled "**CLINICAL EVALUATION OF HEADACHE IN PATIENTS WITH EPILEPSY**" was done under our supervision and is the bonafide work of **Dr. R.RAMA KRISHNAN**. It is submitted in partial fulfillment of the requirement for the D.M (Neurology) examination.

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CONTENTS

INTRODUCTION

Epilepsy and headache are common neurological problems seen in neurological practice. The relationship between headache and epilepsy remains unresolved[1]. Neuronal hyperexcitability might explain the co morbidity between headache and epilepsy. Spreading depression a postulated pathophysiological mechanism of migraine and epileptic seizures may be the link between these two autonomous disorders[2].

As there are only few studies evaluating the characteristics of headache in patients with epilepsy we have done a study in our centre to analyse headache characteristics in patients with epilepsy.

Headache in patients with epilepsy were studied and classified according to international headache society classification (IHS-2)[3].

AIM OF THE STUDY

1. To analyse headaches occurring in patients with epilepsy and classify them.

2. To study the pattern of headaches associated with different types of epilepsies.

3. To characterise the ictal and peri ictal headaches.

REVIEW OF LITERATURE

Headache is one of humanity's frequent afflictions. It has been estimated that one person in three experiences severe headache at some stage of life. Few symptoms lead to more self-treatment than headache. Most people with a mild recurrent or isolated headache do not consult a physician and therefore the true incidence is unknown. Population based studies have estimated that the lifetime prevalence for any type of headache is in excess of 90% for men and 95% for women[13].

An understanding of the pathophysiology of headache must first start with a knowledge of which intracranial structures are pain sensitive, as reported by Ray and Wolff[14]. The intracranial pain sensitive structures include the arteries of the circle of Willis and the first few centimeters of their medium-sized branches, meningeal (dural) arteries, large veins and dural venous sinuses and portions of the dura near blood vessels. Pain sensitive structures that are external to the skull cavity include the external carotid artery and its branches,

scalp and neck muscles, skin and cutaneous nerves, cervical nerves and nerve roots, mucosa of sinuses and teeth. Pain from these structures is largely carried by cranial nerves V,VII,IX and X. Inflammation, traction, compression, malignant infiltration and other disturbances of pain-sensitive structures lead to headache. Supratentorial lesions tend to produce frontal region pain by involvement of the first division of the trigeminal nerve. Infratentorial lesions tend to refer pain posteriorly because this compartment is innervated by the second and third cervical nerve roots, which also supply the neck. This rule maybe broken when infratentorial lesions or cervical spine pathology produce frontal headache, which is due to involvement of descending components of trigeminal nerve in the cervical cord.

For the last 15 years, the 1988 classification of the International Headache Society[15] has been the accepted standard for headache diagnosis, establishing both uniform terminology and consistent operational diagnostic criteria for the entire range of headache disorders. With the publication of the second edition of the International classification of

headache disorders in January 2004 (ICH-D)[16] neurologists who treat headache should become familiar with the revised criteria which will become the standard for treatment and research.

The International classification of Headache disorders, 2nd edition, groups headache disorders into primary and secondary headaches. The four categories of primary headaches include migraine, Tension Type Headache (TTH), Cluster Headache (CH) other Trigeminal Autonomic Cephalalgias (TAC's) and other primary headaches. There are also eight categories of secondary headache (Table – 1) and a third group that includes central and primary causes of facial pain and other headaches. The criteria for primary headaches are clinical and descriptive with a few exceptions not based on etiology.

The classification is hierarchical, allowing diagnosis with varying degrees of specificity, using up to four digits for coding at subordinate levels. The first digit specifies the major diagnostic type e.g. migraine (1). The second digit indicates a subtype within the category, e.g., migraine with aura (1.2)

subsequent digits permit more specific diagnosis for some subtypes of headache according to circumstantial requirements, FHM for example could be coded as 1.2.4. In clinical practice patients should receive a diagnosis for each headache type or subtype they currently have. Multiple diagnotic codes should be listed in their order of importance to the patient.

For headaches that meet all but one of a set of diagnostic criteria without fulfilling those of another headache disorder there are “probable” subcategories for e.g.: probable migraine (1.6).

Table –1: First level of the international classification of Headache disorders, 2nd edition

PART ONE: The Primary Headaches

1. Migraine
2. Tension- type Headache (TTH)
3. Cluster headache and other trigeminal autonomic cephalalgias
4. Other primary headaches.

PART TWO: The Secondary Headaches.

5. Headache attributed to head and/or neck trauma.

6. Headache attributed to cranial or cervical vascular disorder.

7. Headache attributed to non-vascular intracranial disorder.

8. Headache attributed to a substance or its withdrawal.

9. Headache attributed to infection

10. Headache attributed to disorder of homeostasis.

11. Headache or facial pain attributed to disorders of cranium, neck, eyes, ears, nose, sinuses, teeth, mouth or other facial or cranial structures.

12. Headache attributed to psychiatric disorder.

PART THREE: Cranial neuralgias, central and primary facial pain and other headaches

13. Cranial neuralgias, and central causes of facial pain

14. Other headache, cranial neuralgia, central or primary facial pain.

1. ***Migraine is further classified into five major categories***

1.1: Migraine without aura

1.2: Migraine with aura

1.2.1: typical aura with migraine headache

1.2.2: Typical aura with non- migraine headache

1.2.3: Typical aura without headache.

1.2.4: Familial hemiplegic migraine.

1.2.5: Sporadic hemiplegic migraine.

1.2.6: Basilar type migraine.

1.3: Childhood periodic syndromes that are commonly precursors of migraine.

1.4: Retinal migraine

1.5: Complications of migraine

1.5.1: Chronic migraine

1.5.2: Status migrainosus

1.5.3: Persistent aura without infarction

1.5.4: Migrainous infarction

1.5.5: Migraine triggered seizure.

1.6: Probable migraine.

2. *Tension type headache is further classified into three* categories:

2.1: Infrequent episodic TTH

2.2: Frequent episodic TTH

2.3: Chronic TTH

7.6.1 Diagnostic criteria for Hemicrania epileptica:

a) Headache lasting for second to minutes with features of migraine, fulfilling criteria C and D.

b) The patient is having a partial epileptic seizure.

c) Headache develops synchronously with the seizure and is ipsilateral to the ictal discharge.

d) Headaches resolve immediately after the seizure.

Diagnosis demonstrates the presence of EEG discharge along with headache.

7.6.2 Post ictal headache:

Diagnostic criteria:

a) Headache with features of tension type headache or in a patient with migraine of migraine headache and fulfilling criteria C and D.

b) The patient has had a partial or generalized seizure.

c) Headache develops within 3 hours following the seizure.

d) Headache resolves within 72 hours after the seizure.

14.1 HEADACHE NOT ELSEWHERE CLASSIFIED

Previously used term: Headache not classifiable.

Diagnostic Criteria:

A) Headache with characteristic features suggesting that it is a unique diagnostic entity.

B) Does not fulfil criteria for any of the headache disorders described above.

Headache diagnosis using the ICHD-2 should proceed in an orderly fashion. First one needs to distinguish primary from secondary headaches. In the absence of secondary

headaches, the clinician proceeds to diagnose a primary headache disorder.

The next step is to divide primary headache based on average monthly frequency of the headache. Those of low to moderate frequency (<15 headache days per month), or those of high frequency (≥ 15 headache days per month). Third step is to classify the headache as shorter duration (<4 hours a day) or long duration (>4 hours a day).

Low to moderate frequency headaches of long duration include migraine and Episodic Tension Type Headache (ETTH). High frequency headaches of long duration include chronic migraine, Chronic Tension Type headache, New daily persistent headache and hemicrania continua.

Third for shorter duration headache of low or high frequency, consider whether it is triggered by coughing, straining or valsalva maneuver or by exertion or sleep or sexual activity. High frequency short duration headaches not triggered by these include episodic cluster headache, episodic and paroxysmal hypnic headache and SUNCT syndrome[14].

Headache attributed to epileptic seizures is classified under 7.6 in IHS-2 classification.

The common types of primary headaches seen in practice[15] are

i) Tension type headache 45%

ii) Migraine 30%

iii) Cluster headache <1%

iv) Neuralgia <1%

Anderman F[23] suggested that there is an increasing body of evidence to suggest that benign rolandic epilepsy and benign occipital epilepsy of childhood are frequently associated with migraine and that this report will stimulate further research into this intriguing association of two conditions which though they have different pathophysiology frequently co-exist.

In the study done by Nevo Y[7] in 312 patients with chronic headache, he showed that 54%of them had migraine and 22% had tension type headache. Most common type of migraine is

migraine without aura (85%) while classical and complicated migraine was found in only 8.8% and 5.8% respectively. Brief headaches lasting from seconds to few minutes were found in 5.1% of the patients evaluated. In this subgroup a high rate of epileptic EEG activity was found.

Epilepsy is one of the most common of serious neurological neurological conditions. The modern concept of epilepsy owes much to two founding fathers: Hughlings Jackson and Gowers. Incidence of epilepsy varies between 11/1,00,000 and 134/ 1,00,000. In rural south India the incidence is 49.3/1,00,000 Prevalence of epilepsy vary in different studies from 1.5/ 1000 to 31/1000.

There are two main classification systems in use.

2.1: The ILAE classification of Epileptic seizures[28].

2.2: The ILAE classification of Epileptic and Epileptic syndrome[29].

International classification of Epilepsies, Epileptic syndrome and related seizures disorders

1. Localization -related(focal, local, partial)

1.1 Idiopathic (primary)

- Benign childhood epilepsy with centrotemporal spikes.
- Childhood epilepsy with occipital paroxysms.
- Primary reading epilepsy

1.2 Symptomatic (secondary)

- Temporal lobe epilepsies
- Frontal lobe epilepsies
- Parietal lobe epilepsies
- Occipital lobe epilepsies
- Chronic progressive epilepsia partialis continua of childhood characterized by seizures with specific modes of precipitation

1.3 Cryptogenic, defined by:

- Seizure type
- Clinical features
- Etiology

- Anatomical localization

2. Generalized

2.1 Idiopathic (primary)

- Benign neonatal familial convulsions
- Benign neonatal convulsions
- Benign myoclonic epilepsy in infancy
- Childhood absence epilepsy (pyknolepsy)
- Juvenile absence epilepsy
- Juvenile myoclonic epilepsy (impulsive petit mal)
- Epilepsies with generalized tonic- clonic seizures on awakening
- Other generalized idiopathic epilepsies
- Epilepsies with seizures precipitated by specific lie modes of action.

2.2. Cryptogenic or symptomatic

- West syndrome (infantile spasms)
- Lennox- Gastaut syndrome
- Epilepsy with myoclonic-astatic seizures
- Epilepsy with myoclonic absences

2.3 Symptomatic (secondary)

2.3.1 Nonspecific etiology

- Early myoclonic encephalopathy
- Early infantile epileptic encephalopathy with suppression of bursts
- Other symptomatic generalized epilepsies

2.3.2 Specific Syndromes

- Epileptic seizures may complicate many disease states.

Undetermined epilepsies

3.1 With both generalized and focal seizures

- Neonatal seizures
- Severe myoclonic epilepsy in infancy
- Epilepsy with continuous spike-waves during slow wave sleep
- Acquired epileptic aphasia

(Landau-Kleffner syndrome)

- Other undetermined epilepsies

3.2 Without unequivocal generalized or focal features

Special Syndromes

4.1 Situation-related seizures

- Febrile convulsions
- Isolated seizures or isolated status epilepticus
- Seizures occurring only when there is an acute or toxic event due to factors such as alcohol, drugs, eclampsia, nonketotic hyper glycemia.

From: Commission on Classification and Terminology of the International League against Epilepsy, 1989.

International Classification of Epileptic Seizures

I. Partial (focal, local) seizures

A. <u>Simple Partial Seizures</u>

1. With motor signs

2. With somatosensory or special sensory symptoms signs

3. With autononic symptoms or

4. With psychic symptoms

B. <u>Complex Partial Seizures</u>

1. Simple partial onset followed by impairment of consciousness

2. With impairment of conscious ness at onset.

C. <u>Partial seizures evolving to secondarily generalized seizures</u>

1. Simple partial seizures evolving to generalized seizures

2. Complex partial seizures evolving to generalized seizures

3. Simple partial seizures evolving to complex partial seizures to generalized seizures

II. Generalized seizures (convulsive or no convulsive)

A. Absence seizures

1. Typical absences

2. Atypical absences

B. Myoclonic seizures

C. Clonic seizures

D. Tonic seizures

E. Tonic-clonic seizures

F. Atonic seizures (astatic seizures)

III. Unclassified epileptic seizures

From: Commission on Classification and Terminology of the International Leaguea against Epilepsy, 1981.

The relationship between headache and epilepsy remains unresolved. Neuronal hyperexicitability might explain the co morbidity between headache and epilepsy.

Migraine and epilepsy are co morbid. Andermann and Andermann[17] reported a median epilepsy prevalence of 5.9% (range 1 to 17%) in migraineurs, which greatly exceeds the population prevalence of 0.5% (Hauser et al, 1991)[18]. The reported migraine prevalence in epileptics ranges from 8 to 23% (Olesen 93). The co morbidity of migraine and epilepsy was studied using Columbia University's epilepsy family study (Ottman and Lipton, 1994)[19]. Among subjects with epilepsy (probands) the prevalence of a migraine history was 24%. Among relatives with epilepsy, 26% had a history of migraine. Using reconstructed cohort methods, migraine risk is elevated both before and after seizure onset, therefore it cannot be accounted for solely as a cause or consequence of epilepsy (Ottman and Lipton, 1994)[20]. Environmental risk factors cannot fully account for this co morbidity because migraine risk is also elevated in individuals with idiopathic epilepsy. Shared genetic factors cannot completely account for co morbidity as migraine

risk is elevated in probands with and without a positive family history of epilepsy. Perhaps an altered brain state increases the risk of both migraine and epilepsy and thus accounts for the co morbidity of these disorders (Welch et al, 1991)[21] or alterations in neurotransmitters provide plausible potential substrates for this alteration in neuronal excitability (Welch, 1987 et al).

Comparing the interictal headache on the basis of seizure type Karaai et al[5], could not find any significant difference between the seizure groups. Seventy nine (58.51%) patients had peri-ictal headache. Eleven of these patients had preictal headache (Pri H), three of all had ictal headache and 56 of these had post ictal headache. Pre ictal and post ictal headache were more frequently encountered before and after secondary generalized tonic-clonic seizures (GTCS) compared to other seizure groups. The type of post ictal headache was ‘throbbing’ in CPS and ‘steady’ in GTCS.

Guidetti V et al[22] on analyzing the relationships between various types of headache and epilepsy in a sample of 620 children found that the frequency of epilepsy was uniform

across the various types of headache, migrainous or not. The frequency of epileptiform EEG's was high (20%) compared to the control group, but was not an index of severity of headache, except in cases with multifocal EEG abnormalities.

Leniger et al[2] over a period of 15 months, analysed 341 patients with epilepsy for seizure associated headache which was present in 115 patients. Seizures were always accompanied by headache in 60% of them, 3%(4) of these patients had only preictal headache and 70%(80) patients only postictally. Seizure associated headache could be classified as migraine headache in 55.7% as tension type headache in 36.5%.

Schon and Blau[11] reported on 100 people with epilepsy, in whom 51 had postictal headache. Post ictal headache was more commonly associated with generalized tonic-clonic seizures than with focal seizures. The headaches were either bilateral or unilateral. They were associated with photophobia and phonophobia, throbbing pain, vomiting, nausea and visual aura and lasted 6-72 hours. Independent migraine attacks occurred in 9% of these patients. The mechanism of ictal and

psot ictal headache is uncertain. In recent years the theory of migraine pathogenesis has focused on the trigeminovascular system.

Septien et al[24] analysed retrospectively the incidence of migraine in 129 patients with rolandic epilepsy and found that migraine was present in 63% of the patients with centro-temporal epilepsy (rolandic epilepsy), in 33% with absence epilepsy, in 7% with partial epilepsy and in 9% of the cranial trauma group. These results suggests that the association of epilepsy and migraine is non-fortuitous and also to a lesser degree in absence epilepsy.

Ito M et al[25] investigated post-ictal headaches using a questionnaire to ascertain their characteristics and compare them among different types of epilepsy. Post ictal headache occurred in 62% of occipital lobe epilepsy and 23% of temporal lobe epilepsy. The quality of pain was steady in 71% of occipital lobe epilepsy and 29% of temporal lobe epilepsy as opposed to pounding. Analysis of clinical factors such as age of onset, duration of epilepsy, seizure frequency, family history of headache and interictal headache did not reveal and

significant relationship to post ictal headache although generalized tonic clinic seizures are more frequently associated with post ictal headache.

Bernasconi et at[9] conducted a standarised interview in 100 patients with partial epilepsy, 60 with temporal tobe epilepsy and 40 with extra temporal epilepsy. Peri-ictal headache occurred in 47% of patients and peri-ictal headache was more likely to be ipsilateral to the seizure onset in TLE (90%) than in extra temporal epilepsy seen in only 12% patients. In both these groups, peri-ictal headache conformed to the diagnostic criteria for common migraine. Lossius R et al[26] in his article noted paroxysmal headache occur as a part of an ictal epileptic event which is corroborated by epileptiform activity in EEG.

Leutmezer F et al [27] analysing post ictal signs and their importance in localising and lateralising focal epilepsy noted that post ictal signs can provide reliable information for the localization of the seizure onset in patients with focal epilepsy. Some of the important post ictal signs noted are post ictal headache, post ictal hemipareis post ictal hemianopia post

ictal language dysfunction and post ictal congnitive impairment.

Founderreuther et al[12] analysed 110 patients for seizure associated headache and found the incidence to be 43% 43 patients had exclusively post ictal headaches. One patient had exclusively preictal headaches and three patients had both pre and post ictal headaches. The Duration of post ictal headache was longer than four hours in 62.5% of the patients and in the majority of patients post ictal headaches occurred is less than 50% of the times in association with seizures. Post ictal headaches were classified as migraine type in 34% of patients and as tension type headache in 34% of patients headaches could not be classified in 21% of patients and there was no relationship between the localization of the epileptogenic focus localization of the headache or the headache classification.

MATERIALS AND METHODS

STUDY DESIGN:

Cross Sectional Descriptive study.

STUDY POPULATION:

Patients with epilepsy who have headache either interictally or peri ictally or both who attended either Neurology O.P. Government General Hospital, Chennai during the study period (July 2003 to August 2005) were taken up for the study.

INCLUSION CRITERIA

1. Patients with epilepsy who have inter ictal headache of >3 months duration antecedent to or after the onset of seizures.

2. Patients with epilepsy who have peri ictal headache

EXCLUSION CRITERIA

Patients with epilepsy who developed sudden onset severe headache, headache with systemic signs such as fever, neck stiffness, cutaneous rash, headache with papilloedema,

headache triggered by cough, exertion or valsalva manellver were excluded from the study.

Patients with epilepsy who have either interictal or perictal headaches who did not have any features of exclusion criteria were selected for the study. After being included in the study, seizures were classified according to the ILAE classification and their duration noted.

The presence of headache whether antecedent to seizure onset or after the onset of seizures are noted. Headache is classified based on the diagnostic criteria as recommended by International Headache Society II in 2004. Presence or absence of relationship of type of seizure to subtype of headache was analysed.

Headache was categorised into interictal, ictal or periictal headache (seizure associated headache) on the basis of its relationship with epilepsy. Patients with interictal headache, who have structural lesions or other recognisable causes such as sinusitis, cervical spine disease were classified as secondary headache as recommended in the International

Headache society classification and those without a recognisable cause as having primary headache.

All patients in the study were examined clinically for focal neurological deficit. Otorhinolaryngologist and dentist opinion were sought whenever necessary.

Patients who had headaches along with the onset of seizures and continued throughout the ictus which resolves with subsidence of seizure activity were classified as ictal headaches or hemicrania epileptica.

Peri ictal headaches were subdivided into postical headache and preictal headache based on their relationship with seizures. Patients who have headache just preceding the onset of seizures were classified as preictal headache.

Patients who had headaches with varying characteristics and severity which developes within 3 hours of seizure and lasts for less than 72 hours are classified as postictal headaches. Patients who initially had seizures and in whom seizures got controlled with drugs with new onset headache or persistence of precedent headache which are of short duration

lasting for 5-10 minutes, severe in intensity stabbing or bounding in nature associated with transient unawareness or incontinence were classified as headache not classified elsewhere.

Primary headaches were further analysed based on the frequency and duration of headache episodes. On the basis of frequency they were subdivided into low to moderate frequency headaches. On the basis of duration they were subdivided into shorter duration or longer duration headaches. Based on these clinical features primary headaches were classified into migraine headache, tension type headache cluster headache and other trigeminal autonomic cephalalgia and other primary headaches such as primary stabbing headache. If headache was atypical or difficult to classify, the possibility of secondary headache was reconsidered, keeping in mind the modifying effect of anti epileptic medications.

Headaches were classified according to the predominant headache type if the patient had multiple headache types.

RESULTS AND ANALYSIS

Total No of patients studied were 124.

AGE:

Out of this the age of patients ranged from 9 to 54 years. The age range along with age and sex distribution of patients within each age range is shown in Table No.1.

Table 1: Showing age and sex distribution of patients in each age range

Age	*Sex*		*No. of patients*	*Percentage*
	Male	*Female*		
0-10	–	1	1	0.8%
11-20 yrs	10	17	27	21%
21-30 yrs	19	39	58	46%
31-40 yrs	8	16	24	19%
41-50 yrs	4	7	11	8%
>50 yrs	1	2	3	2%

SEX:

Males comprised 33% (n=42) and females 66% (n= 82) of the total study population (Table No.1).

SEIZURE TYPES:

The most common type of seizures seen were generalised tonic clonic seizures. 42% of patients (n=52) had primary generalised tonic- clonic seizures and 38.7% of patients (n=48) have secondary generalised tonic-clonic seizures. Among 48 patients with 2*GTCS, 27 cases were of simple partial seizures with secondary generalisation and 21 were of complex partial in nature with secondary generalisation (See Table 2).

Table 2: Showing type of seizures seen in headache patients

Seizure type	***Male (No. of Patients)***	***Female***
Primary GTCS	15	37
Secondary GTCS	19	29
SPS with 2 GTCS*	11	16
CPS with 2 GTCS*	8	13
Simple partial seizure	3	6
Complex partial seizure	4	10
Absence seizure	1	

Simple partial seizures were seen in 9 cases and complex partial seizures seen in 14 cases. Absence seizure was seen in one patient and tonic seizure in 1 patient.

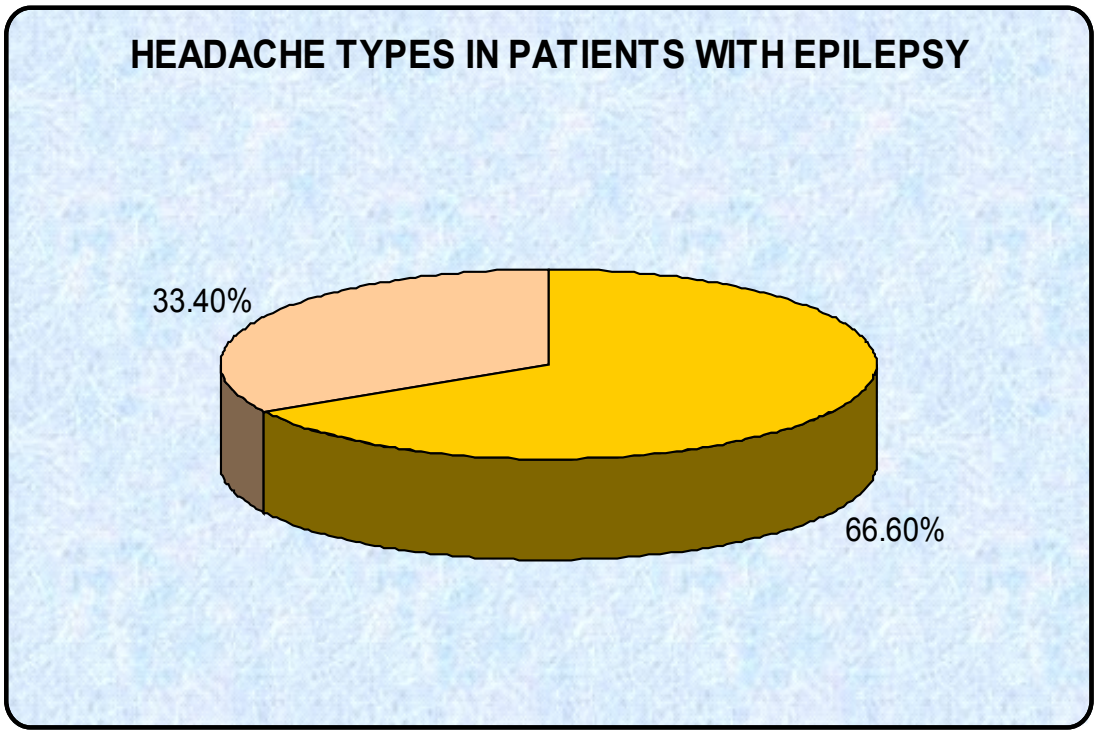
Table 3: Showing relationship between seizure type and interictal headache subtype

Seizure type	***Migraine Headache***	***Tension type***	***Episodic***	***Primary***	***Secondary***

						headache			*cluster*	*stabbing headache*	*H/A*
	1.1	1.2	1.2.6	1.5.1	1.6	2.1	2.2	2.3			
GTCS primary	7	3	1	6	3	4	8	1		4	1sinusitis 1neck trauma
Secondary GTCS											
SPS with 2* GTCS	4	2	-	3	-	2	2	-	-	-	1 infection
CPS with 2* GTCS	3	2	-	2	-	1	2	-	-	-	-
Simple partial seizures	2	1	-	-	-	1	2	-	-	1	-
Complex partial seizure	3	2	-	1	-	1	-	1	1	1	-
Absence											1 Sinusitis
Tonic seizure											1 Sinusitis

HEADACHE TYPE:

Interictal headache was present in 82 patients (66.6%) and seizure associated headache in 42 patients (33.4%) with epilepsy. Seizure associated headache include preictal, ictal and post ictal headaches. (See Diagram 1).



Interictal headache:

Among 82 patients with interictal headache 94% (n=77/82) had primary headache and 5 (6%) had secondary headache.

Table 4: Showing interictal headache subtypes in epilepsy patients

Headache Type	*No. of Patients*	*Male*	*Female*	*%*
Primary	77			94%
MIGRAINE	45/82			54%
1.1: Migraine without aura	19/45	6	13	42%
1.2: Migraine with aura	10/45	2	8	22.2%
1.2.6: Basilar type migraine	1/45	1		2.2%
1.5.1: Chronic migraine	12/45	3	9	26%
1.6: Probable migraine	3/45	1	2	6.6%

TENSION TYPE HEADACHE	25/82			30.4%
2.1: Infrequent Episodic TTH	9/25	3	6	36%
2.2: Frequent Episodic TTH	14/25	4	10	56%
2.3: Chronic TTH	2/25		2	8%
3.1: Episodic cluster headache	1/82	1		1.2%
4.1: Primary stabbing Headache	6/82	2	4	7.3%
MULTIPLE HEADACHE TYPES	11			13.4%
primarily migraine type	7/11			63.6%
Primarily tension type	4/11			36.3%
SECONDARY HEADACHE	5/82			6%
5. Headache with neck trauma	1		1	
9. Headache with intracranial infn	1	1		
11. Headache with ear, sinus or tooth disease.	3	2	1	

Among 77 patients with primary headache (see table 4) migraine type headache was seen in 54% (n=45) of patients. Among these 45 patients, 19 of them satisfied the criteria for migraine without aura. *(1.1)* 10 of them had features of migraine with aura *(1.2)*. Basilar type migraine *(1.2.6)* was seen in one and chronic migraine *1.5.1* was seen in 12 patients with epilepsy. Among them 10 of them were transformed from migraine without aura and two from migraine with aura. Probable migraine *(1.6)* is seen in 3 patients with epilepsy.

Tension type headache occurred interictally in 30.4% (n=25) of patients with epilepsy. Among these 25 patients nine had infrequent episodic tension type headache *(2.1)*, 14 have frequent episodic tension type headache *(2.2)* and 2 had chronic tension type headache *(2.3)*.

Episodic cluster headache (*3.1.1*) was seen in one patient and primary stabbing headache *(4.1)* was seen in 6 patients with epilepsy.

Secondary headache was seen in 6% (n=5) of patients with epilepsy. Of them headache associated with neck trauma *(5)* was seen in one patient and intracranial infection *(9)* in one patient with epilepsy (CT scan Brain showed tuberculoma). The remaining three patients had sinus disease *(11)* along with seizures.

11 patients with epilepsy had multiple headache types. Among them 7 patients had primarily migraine type of headache along with infrequent episodic tension type headache. One patient had migraine without aura with dental caries. One patient with migraine had frontal sinus disease.

Four patients had frequent episodic tension type headache along with dental caries.

Seizure associated headache (Pre ictal, ictal & post ictal headache)

Among 42 patients with seizure associated headache, 24 (19.3%) had headache which might be an ictus without accompanying seizure activity classified as headache which could not be elsewhere classified *(14.1)* and 18 had (14.5%) pre ictal, ictal or post ictal headache.

Pre ictal Headache was seen in (4/18) of cases with epilepsy of whom 3 is seen in complex partial seizures and 1 in simple partial seizures. Pre ictal headache occurs equally in both sexes and the seizures were >10 years in duration. EEG was abnormal in one and CT scan brain showed old infarct in right parietal region in one patient.

Table 5: Table Showing No.of Patient with Seizure associated headache

Headache type	*No. of Patients*	*Male*	*Female*	*%*
SEIZURE ASSOCIATED HEADACHE	18			14.5%
Preictal Headache	4/18	2	2	22.2%
7.6.1: Hemicrania	1/18	1		5.5%

epileptica				
7.6.2: Postictal headache	13/18	8	5	72.2%
14.1: Headache not elsewhere classified	24/124	16	8	19.3%

One male (1/18) patient (5.5%) with simple partial seizure had hemicrania epileptica *(7.6.1)*. His CT scan Brain was normal (See table 6).

Table 6: Showing seizure type in patients with seizure associated headache

Seizure Type	*Headache as*		*Post ictal headache*	*Headache not elsewhere classified*
	Pre ictal Aura	*Epieptic hemicrania*		
Primary GTCS	–	–	9	4
Secondary GTCS SPS with 2^0GTS CPS with 2^0 GTS			3	9 11
Simple partial seizure	1	1	–	–
Complex Partial Seizure	3		1	

Post ictal headache was seen in 72.2% (13/18) of patients with epilepsy. The headache lasted for <6hrs in 8/13 of patients, 6-12 hrs in 3 patients and >12hrs in two patients.

Headache fited into the criteria for probable migraine in 3 out of 13 (23%) and were of tension type in patients and could not be classified 8 in patients.

Majority of Post ictal headache occurred in relation to GTCS (n=12/13) (1^0 GTCS in 9 & SPS with 2^0 GTCS in 3). However the headache recurred post ictally only with a third of such seizures. Only patient with complex partial seizure had

post ictal headache occurring 20% of the time. The two patients with post ictal headache of tension type also have tension type headache interictally. Patients with post ictal headache of probable migraine and unclassified type of headache did not have interictal headache. The characteristics of post ictal headache remained the same, each time it occurred in patients with epilepsy.

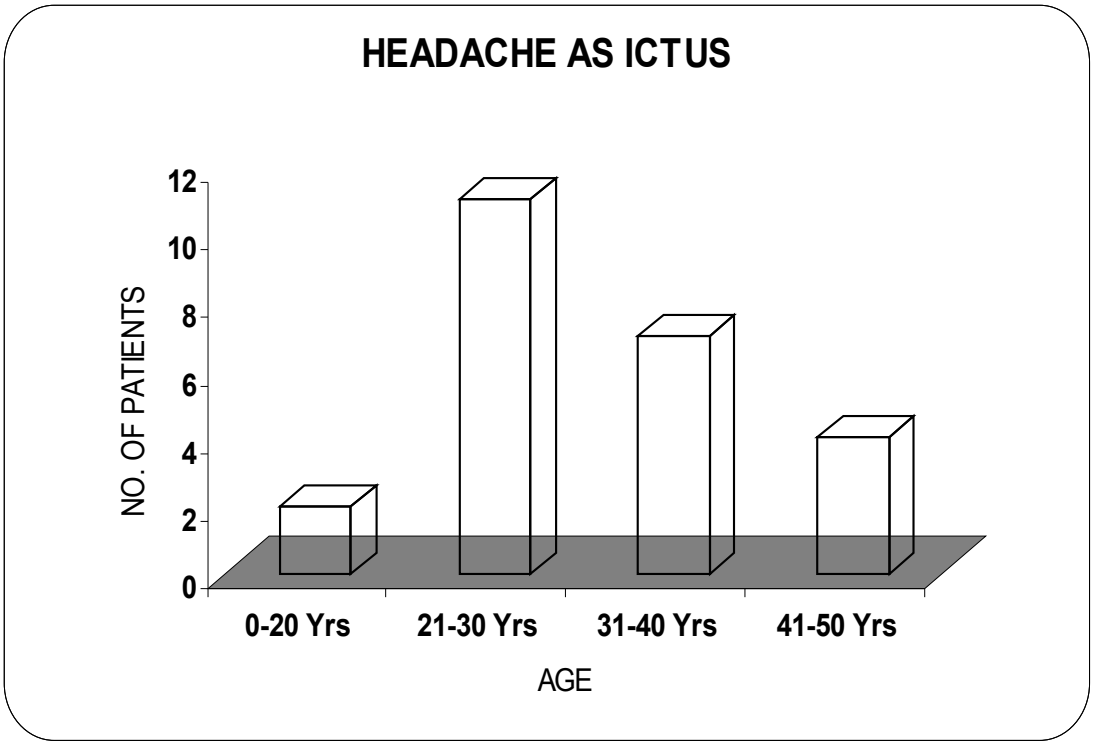
Headache as ictus:

Headache which could not be elsewhere classified *(14.1)* occurred in 19% (n=24) of patients with epilepsy.

The age group of these patients ranged from 16 years to 46 years. Twelve patients were in the age group 21-30 years followed by seven patients in the age group of 31-40years. Three patients are in the age group 41-50 years and 2 in 11-20 years age group. Females comprise 75% of the population (n=18) of patients with headache whereas males make 25% of the population (n=6).

The duration of the seizure was mostly 6-10 years as seen in 11 of patients followed by 11-20 yrs seen in 9 patients and <6 years in 4 patients.

Secondary GTCS was the most common type of seizure seen in this group of patients which comprise 83% of them (n=20/24). Most common type of seizure type seen was CPS with secondary generalisation seen in 11 patients. Simple partial seizures with secondary generalisation was seen in 9 patients and primary GTCS was seen in 4 patients (shown in bar chart).



The duration of headache was 5-10 min in all the patients (24/24) and severe in intensity, frequency varied from 1-2 episodes per day to once in few days, character of headache was stabbing or pulsating in nature, associated with

transient unawareness in all (100%) of patients. Incontinence is present in 5 of these patients occasionally. CT scan brain was abnormal in 3 out of 24 patients and they show old healed calcification in two patients and old infarct in one of them. EEG was normal in 25% and abnormal in 75% of patients.

Among these 24 patients, had headache as ictal event along with seizures, seizures has got subsided with treatment however the patients continued to suffer headaches which could not be classified and are probably ictus in nature.

Headache was present antecedent to the onset of seizures in 6 of these patients (25%), Episodic migraine being present in 4 of them and frequent episodic tension type headache in 2 of them.

DISCUSSION

In this study, the most common type of seizures seen were primary generalized tonic-clonic seizures seen in 52 patients followed by secondary generalized tonic clonic seizures seen in 47 patients. Females out number males in all seizure types except for absence and tonic seizures both of whom were male patients.

The seizures were more frequently seen between 21-30 years of age present in 48% of cases (n=47) followed by 11-20 years of age present in 21% of cases (n=27).

Primary headache contributed to the maximum number of cases of interictal headache seen in patients with epilepsy noted in 94% of cases (n=77/82) and secondary headache in 6% (5/82) of patients. Seizure associated headache was seen in 42 patients among whom peri ictal headache contributed to 42.8% (18/42) of patients. In patients with seizure associated headache there was a sub-group of patients with epilepsy who had headache which could not be elsewhere classified *(14.1)* and probably ictus which comprised 19% (n=24) of the total

population. This varies with the results of the study done by Karaali et al[5] who studied the type and frequency of interictal and peri ictal headache in 109 patients with partial onset and 26 patients with generalized seizures. In their study interictal headache was present in 40.7% (50) of 135 patients and 58.51% (39) had perictal headache. The discrepancy in our study may be due to headache being overlooked by patients because of the short duration of headache and due to the dramatic nature of seizures and also because more number of cases are partial onset in Karaali's study whereas generalized seizures were more common in our group.

The most common type of primary headache seen in our study was migraine seen in 54% of cases (n=45). Migraine without aura was more common seen in 19 of them than migraine with aura which was present in 10 patients. This is in agreement with the study done by Yamane et al[6] who evaluated 50 children with epilepsy and classified the various types of headache. The most common form of primary headache is migraine which is present in 44% of patients (n=2) and 18% (n=9) of patients have tension type headache. They

have not further analysed on the type of migraine seen in their patients.

The findings in the present study also correlated with the study done by Velio Flu et al[30] who studied relationship between epilepsy and migraine in 412 adult patients. In their study 14% of patients had migraine and migraine without aura (10%) is more common than migraine with aura (14%) Neuronal hyper excitability might explain the comorbidily of migraine and epilepsy[2].

In this study all the headache sub types were more common in primary generalized tonic-clonic seizures than in other seizure types. This is not in accordance with the study done by Guidetti V et al[22] who noted on analyzing 620 children that the frequency of epilepsy was uniform across various types of headache, migrainous or not. The same was echoed by Savoldi F et al[1] who on analyzing 36 patients with epilepsy and headache along with 3600 patients affected by primary headache showed that there was no relationship between epileptic seizure and headache in more than 50% of the patients. The discrepancy may be due to high frequency of

generalized tonic-clonic seizures in our study which forms 42% of the total study population.

There was no specific correlation between seizure type and migraine subtype seen in this study which contrasts with the study done by Leniger et al[2] who noted that migraine with aura was seen more frequently in patients with migraine and epilepsy.

Females were noted to be more commonly affected with migraine seen in 32 patients than males which is in agreement with the study done by Leniger et al[2] in whom proposition of females were more than males in a study of 61 patients.

The next common form of primary headache seen in this study was Tension type headache which was present in 30.4% (n=25) of cases among which frequent episodic tension type headache was the most common type seen in 14 out of 25 patients infrequent episodic tension type headache is seen in 36% of cases (9/25) and chronic tension type headache in 2 patients. This is in agreement with the study made by Yamane et al[6] who have studied the type of headache in 50 children with epilepsy. The most common type of headache seen is

migraine present in 44% of children followed by tension type headache seen in 18% of the children with epilepsy. Another study done by Nevo Y et al[7] in 312 patients showed that migraine is the most common type of primary headache seen in 54% of patients followed by tension type of headache seen in 22% of patients. They have not further classified tension type headache into its subtypes.

In this study one case (1.2%) had episodic cluster type headache which was seen in a patient with complex partial seizures. This also has been reported in a case report by Dalla et al[8] in Italian journal of Neurological sciences in 1992.

Primary stabbing headache occurred in 7.3% (n=6) of our patients which has not been reported in other studies.

Pre ictal headache occurred in 4 patients in this series. Of these 4 patients 3 (75%) had complex partial motor seizures and one (25%) was of simple partial motor type. One patient with simple partial seizure had headache throughout the seizures which recedes with subsidence of seizures and was classified as epileptic hemicrania. His CT scan brain showed old infarct in left parietooccipital region. The same

degree of involvement has been noted in other study done by Karaali et al[5] who observed that among 135 patients with seizures, 11 had preictal headache (8%) when compared to postictal headache seen in 56 cases (41%). This is also in agreement with the study done by Leniger et al[2] who in analysis of 341 patients, found preictal headache in 4(3%) out of 115 patients and post ictal headache in 80 (70%) of patients. In another study done by Founderreuther S et al[12] he observed preictal headache in 1 out of 47 patients and 43 patients had postictal headache. The headache also has lateralizing value as seen by its location which occurred ipsilateral to seizure onset in our patients with both secondary generalized seizures and complex partial seizures of temporal lobe origin which corroborates with the study done by Bernasconi A et al[9] who showed that peri ictal headache occurred ipsilateral to seizure in 27/30 patients with TLE. Post ictal headache occurred in 72.2% (n=13) of patients with seizure associated headache which is in agreement to other studies done by Karaali et al[5], Founderreuther et al[12] which has been already mentioned. Among our patients with post ictal headache, duration of headache is <6 hours in 61% (n=8)

of patients, 6-12 hours in 23% of patients (n=3) and >12 hours in 15% of patients (n=2). The diagnosis of headache was probable migraine in 23% (n=3), tension type headache in 15% (n=2) and could not be classified in 61.5% of cases (n=8). Majority of post ictal headache occurred in relation to GTCS, seen in 12/13 patients. Primary GTCS occurred in 9 patients and SPS with 2 GTCS is seen in 3 patients with post ictal headache. Postictal headache followed GTCS one third of the time i.e. 33.3%. This is in correlation with the study done by Founderreuther et al[12] in whom post ictal headache occurred <50% of the time. One patient with complex partial seizure is associated with post ictal headache which occurred 20% of the time.

The type of headache remained the same with each episode of post ictal headache. Patients who had tension type of headache postictally also had tension type of headache interictally whereas patients with post ictal headache of probable migraine or unclassified type did not have inter ictal headache. The other studies have not analysed post ictal head ache on these basis.

The duration of headache is in correlation with study done in 372 patients attending an epilepsy clinic by Silberstein et al[10] where duration of postictal headache is <6 hours in 81% pts, 6-12 hrs: no patients and >12hrs in 11% of patients. In another study done by Schon and Blau[11] in 100 patients with epilepsy. 51 had post ictal headache. Post ictal headache was more commonly associated with generalized tonic clonic seizures than with focal seizures which is not accordance with our study. The duration of headache is most commonly >6hrs. The diagnosis of postictal headache is probable migraine in 50% of patients which is not in accordance with our study. Foundereuther et al[12] in his analysis of seizure associated headache in 47 patients, observed postictal headache in 43 patients (91%). Headaches were classified as migraine type in 34% and tension type in 34% of patients. Headaches could not be classified in 21% of patients which is in agreement with our study. The duration of headache is <6 hours in 42.5% of patients. The mechanism of ictal and postictal headache is uncertain. The proposed mechanism of postictal headache is that it arises intracranially and is related to the vasodilation which follow seizures.

Headache which could not be elsewhere classified occurred in 19% of patients (24). Most of these patients were in the age group of 21-30 yrs (45.8%) followed by 31-40 yrs (29.16%), duration of seizures is between 6-10yrs in 45.8% of patients and 11-20 year in 37.5% of patients. Most of the cases were of secondary generalized tonic-clonic type (20/24). CPS with 2 GTCS occurred in 11 patients followed by SPS with 2^0 GTCS which occurred in 9 patients. Primary generalized tonic-clonic seizure were seen in 16.6% (n=4) of patients. The headache seen in these patients was of short duration lasting for 5-10 minutes severe in intensity, stabbing or pulsating in nature, associated with impaired awareness in all the patients and urinary incontinence was seen in 20% of these patients. CT scan brain was normal in 87.5% of patients. EEG was abnormal in 75% of these patients, showing diffuse epileptiform activity. 30% of these patients also had headache along with seizures initially with persistence of headache alone after control of seizures.

This has been analysed in the paper by Lossius R et al where he has assessed the connection between epilepsy and

migraine in three patients. The second patient had paroxysmal headache as an isolated ictal event with impaired awareness without any other features of epileptic event. The same also has been discussed by Silberstein et al in his article headache as a consequence of seizure where he notes that headache can be the sole manifestation of epileptic seizure, although this is a relatively rare situation. However both these authors has not discussed either the clinical features of headache or their association with seizure types. Blume and Young's in their epilepsy unit noted that 2.8% of 858 patients had brief ictal pain which accompanied other ictal symptoms all of whom had partial seizures. Isher et al found that hemicranial attacks of pain coincided with seizure activity in EEG and lasted for seconds to minutes. In one case of complex partial status epileptics, the headache lasted for hours. In another case, the headache lasted for 20 minutes of a recorded seizure in EEG without clinical accompaniments. Hence the observation made in this study may be an ictal event in whom generalization has been suppressed as impaired consciousness was present in all patients, EEG was abnormal in 75% (n=18) of patients when compared to patients with interictal headache in whom only

20% of patients have abnormal EEG and seizures which was present along with headache has subsided with persistence of headache in all of them.

Among these patients in whom headache alone occurred, 16.6% of patients had migraine antecedent to the seizures and 8.3% of patients had episodic tension type headache. After starting on AED, migraine attacks has decreased in frequency in those patients who had migraine headache antecedent to seizure onset.

SUMMARY AND CONCLUSION

1. The most common type of seizures seen in patients with headache is generalized tonic-clonic seizures in this study.

2. Primary generalized tonic-clonic seizures is more common than secondary generalized tonic-clonic seizures in patients with headache.

3. Primary headache is seen in 96% of patients and secondary headache in the remaining.

4. Migraine type of headache is the most common primary headache seen interictally in patients with epilepsy. Migraine without aura is more common than migraine with aura.

5. Tension type of headache is the second common type of primary headache seen interictally in patients with epilepsy. Frequent

episodic tension type headache is more common than other tension type headaches.

6. Multiple headaches are seen interictally in 8.8% of patients with epilepsy.

7. There is no specific correlation between headache subtype and type of epilepsy.

8. Seizure associated headaches is seen in 14.5% of patients either as pre ictal or post ictal headache.

9. Post ictal headache is seen in 72.2% of patients with seizure associated headache. Post ictal headache lasts for less than 6 hours in 61% of patients with seizure associated headache. Majority of post ictal headaches occurred in relation to GTCS.

10. The most common form of post ictal headache seen is headache which could not be classified in 61.5% of patients.

11. Pre ictal headache is seen in 4 cases with epilepsy among whom 3 are of CPS type.

12. Headache which could not be elsewhere classified which could be an ictal event is seen interictally in 24 patients (19%) with epilepsy.

13. The headache is usually of short duration, severe in intensity, of variable frequency, stabbing or pulsating in nature, associated with transient unawareness in all patients. EEG is abnormal in 75% of this group of patients.

Hence, this headache seen interictally may be an ictal event in whom generalization has been suppressed as a result of treatment. This could be analysed further by doing functional neutoimaging studies in this group of patients.

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POSTICTAL HEADACHE

Master chart contd.,

S.No	Age	Sex	Seizure	Type	Duration	Character	Nausea	PTB	PNB	Aggr	Adl
1	27	M	1* GTCS	TTH	4-6 hrs	Dull acting heaviness holocranial	+	–	–	–	+
2	32	M	SPS with 2* GTCS	Non Class	4 hrs	Dull acting holocranial heaviness	+	–	–	–	+
3	41	M	1* GTCS	TTH	24 hrs	Heaviness band like holocranial	+	–	–	–	+
4	22	F	1* GTCS	Probable migraine	8-10 hrs	Throbbing bifrontal	-	+	-	-	+
5	28	M	1* GTCS	Unclassified	3-4 hrs	Dull acting heaviness holocranial	–	–	–	–	+
6	24	M	1* GTCS	Unclassified	3-4 hrs	Tightening / pressing holocranial	–	–	–	–	+
7	34	M	1* GTCS	Probable migraine	9-10 hrs	Throbbing Lt. frontotemporal	–	+	–	–	–
8	29	F	SPS with 2* GTCS	Unclassified	30-60 min	Dull aching holocranial	-	-	-	-	-
9	37	F	1* GTCS	Probable	10-12 hrs	Throbbing/	+	+	-	-	-

S.No	Age	Sex	Seizure	Type	Duration	Character	Nausea	PTB	PNB	Aggr	Adl
				migraine		bifrontal					
10	24	M	1* GTCS	Probable migraine	2-4 hrs	Throbbing bifrontal	–	+	–		+
11	18	M	CPS	Unclassified	15-30 min	Dullaching over vertex	–	–	–	–	+
12	24	M	SPS with2* GTCS	TTH	24 hrs - 72 hrs	Dullaching holocranial	+	+	–	–	+
13	27	M	1* GTCs	Unclassified	3-4 hrs	Dullaching holocranial	–	–	–	–	–

HEADACHE WITH COULD NOT BE ELSEWHERE CLASSIFIED

Master Chart Contd.,

S. No	*Age*	*Sex*	*Seizure type*	*Seizure duration*	*Headache duration*	*Headache characteristics*	*CT scan brain*	*EEG*
1.	47	M	SPS with 2*GTCS	3yrs	2yrs	¼-5d /5-10min/sharp/servere /transient unawareness	Old infarct right perisylvian area	Normal record
2.	28	M	CPS with 2* GTCS	6yrs	6yrs	"	Normal	Normal
3.	28	F	CPS at times CPS with 2* GTCS	12yrs	8yrs	1per day/5 min, sharp severe stabbing pain associated with unawareness	Normal	Normal
4.	46	F	SPS with 2* GTCS	2yrs	10yrs	Frequent episodic TTH 1per 2days/5 min, sharp severe pricking, throbbing pain holocranial associated with unawareness	Normal	Abnormal record
5.	28	F	SPS with 2* GTCS	6 yrs	4yrs	1per 5days/5 min, left temporal, throbbing pain, associated with unawareness	Old healed calcification left temporal region	Abnormal record
6.	40	F	CPS with 2* GTCS	4yrs	4yrs	1per 2days/1-2 min, bifrontal throbbing pain associated with giddiness and unawareness	Normal	Abnormal record
7.	27	F	CPS with 2* GTCS	10 yrs	5yrs 12yrs	1per 7days/5 min, severe, stabbing throbbing pain holocranial associated with unawareness Episodic TTH	Normal	Abnormal record

S. No	Age	Sex	Seizure type	Seizure duration	Headache duration	Headache characteristics	CT scan brain	EEG
8.	22	F	CPS with 2* GTCS	10yrs	6yrs	5-10min, severe, stabbing, transient unawareness, incontinence.	Normal	Abnormal record
9.	34	M	1* GTCS	18yrs	10yrs	5-10min, severe, shooting, giddiness, impaired awareness	Normal	Abnormal record
10.	18	F	CPS at times CPS with 2* GTCS	6yrs	4yrs 8yrs	1-2min, sharp, bifrontal, associated with nausea, giddiness unawareness Episodic migraine	Normal	Abnormal record
11.	20	F	1* GTCS	6yrs	3yrs	1-5min, severe, bifrontal, throbbing, associated with transient unawareness, incontinence	Normal	Abnormal record
12.	34	M	CPS with 2* GTCS	15yrs	10yrs	<1min,severe,stabbing, bifrontal associated with transient unawareness	Normal	Normal
13.	38	M	Right SPS with 2* GTCS	10yrs	8yrs	5-10min, severe, sharp,shooting, associated with giddiness, transient unawareness, incontinence. left temporal region.	Normal	Abnormal record
14.	28	F	SPS left SPS with 2* GTCS	7yrs	15yrs	5-10min,severe, sharp, shooting, associated with subjective rotation, transient loc for <1min Migraine without aura initially	Normal	Abnormal record

S. No	Age	Sex	Seizure type	Seizure duration	Headache duration	Headache characteristics	CT scan brain	EEG
15.	42	F	1* GTCS	20 yrs	15yrs 25yrs	<1 min, severe, stabbing, bifrontal, associated with transient loc, incontinence. Episodic migraine without aura	Normal	Abnormal record
16.	28	F	CPS with 2* GTCS	12yrs	10yrs	10-20min, severe, sharp, shooting associated with giddiness transient unawareness	Normal	Abnormal record
17.	32	F	1* GTCS	16yrs	12yrs	Multiple per day, 1-2min, severe, sharp, periorbital, associated with unawareness in continence	Normal	Abnormal record
18.	28	F	SPS SPS with 2* GTCS	12yrs	10yrs 14yrs	5-10min, severe, stabbing bifrontal transient, loc. Episodic migraine	Normal	Abnormal record
19.	26	F	CPS with 2* GTCS	8yrs	8yrs	10-15min,severe, shooting, bifrontal associated with nausea, impaired awareness.	Normal	Abnormal record
20.	28	M	SPS with 2* GTCS	12yrs	10yrs	5-10min, severe, sharp, left temporoparietal, associated with transient loc fall at times	Old healed calcified granuloma left temporal region	Abnormal record
21.	22	F	CPS with 2* GTCS	6yrs	5 yrs	5-10min , severe, shooting, bifrontal associated with nausea, giddiness	Normal	Abnormal

S. No	Age	Sex	Seizure type	Seizure duration	Headache duration	Headache characteristics	CT scan brain	EEG
						unawareness has to sit down		record
22.	28	F	Left SPS with 2* GTCS	12yrs	10yrs	5-10min, severe, throbbing, right temporal region associated with loc	Normal	Abnormal record
23.	32	F	CPS with 2* GTCS	14yrs	4yrs	5-10min, bifrontal, throbbing, associated with loc episodic TTH infrequent	Normal	Normal
24.	34	F	SPS with 2* GTCS	10yrs	8yrs 8yrs	<1min, stabbing, severe, bifrontal, associated with transient unawareness Episodic TTH	Normal	Normal

PRE ICTAL HEADACHE

Master Chart Contd.,

S.No	*Age*	*Sex*	*Seizures duration*	*Seizures Type*	*Headache*	*Investigation*
1	28	F	16yrs	CPS with 2* GTCS	Headache over left temporal, throbbing, followed by giddiness, altered awareness, automatisms, tonic clonic movements, frothing, incontinence.	CT scan brain, EEG normal
2	22	M	11yrs	CPS with 2* GTCS	Headache over left temporal pulsating, heaviness lasts for 5 min followed by partial then GTCS	CT scan brain old infarct left temporoparietal region. EEG normal
3	35	M	12yrs	SPS left with 2*GTCS	Headache over right parietal region followed by motor seizures involving left side of face then GTCS	CT scan brain calcification right parietal region . EEG normal
4	28	M	14yrs	CPS with 2* GTCS	Headache over left periorbital region, severe, sharp, shooting pain lasts for seconds followed by right side upper & lower limb clonic movements with loss of consciousness	CT scan brain normal EEG abnormal record

EPILEPTIC HEMICRANIA

S.No	*Age*	*Sex*	*Seizures duration*	*Seizures Type*	*Headache*	*Investigation*
1	32	F	7 yrs	SPS Right Side	Headache dull aching over left parietal region followed by clonic movements of right upper and lower limbs. Headache subsides with seizures.	CT scan brain, EEG normal

MASTER CHART

S. No	*Age*	*Sex*	*Dur yrs*	*Seizure type*	*Dur H/A*	*H/A sub type*	*CT scan brain*	*EEG*
1.	20	F	12	CPS with 2* GTCS	4	Probable migraine	Normal	Abnormal record
2.	23	M	4	SPS with 2* GTCS	6	Frequent Episodic TTH	Normal	Normal
3.	47	F	30	SPS with 2* GTCS	5	Frequent Episodic TTH	Normal	Normal
4.	28	M	6	CPS with 2* GTCS	6	Migraine without aura + 2.1	Normal	Normal
5.	28	F	12	CPS with 2* GTCS	16	Migraine without aura - 1.5	Normal	Normal
6.	27	F	2	1* GTCS	2	Chronic TTH	Normal	Normal
7.	30	M	15	CPS	20	Migraine with aura	Normal	Normal
8.	30	F	17	1* GTCS	5	Frequent Episodic TTH + Dental Caries	Normal	Normal
9.	27	F	9mo	1* GTCS	7mo	Migraine without aura + 2.1	Normal	Normal
10.	28	F	16	1* GTCS	10	Migraine with aura + 2.1	Normal	Normal
11.	22	M	3	1* GTCS	5	Migraine without aura - 1.5	Normal	Not done
12.	35	M	3	CPS	2	Migraine without aura	Normal	Normal
13.	54	F	3	CPS	1	Primary stabbing headache	Normal	Abnormal record
14.	16	F	6	SPS	12mo	Frequent Episodic TTH	Old infarct right	Normal

S. No	Age	Sex	Dur yrs	Seizure type	Dur H/A	H/A sub type	CT scan brain	EEG
							MCA territory	
15.	45	F	2	SPS	1	Primary stabbing headache	Normal	Normal
16.	30	M	1 1/2	Absence	6mo	Frontal sinusitis	Mucosal thickening	Normal
17.	40	F	16	CPS	16	Migraine with aura	Normal	Normal
18.	36	F	3	SPS with 2* GTCS	12	Migraine without aura-chronic migraine	Normal	Normal
19.	29	F	4	1* GTCS	15	Frequent Episodic TTH	Normal	Normal
20.	17	F	7	SPS with 2* GTCS	2	Frequent Episodic TTH	Normal	Normal
21.	17	F	2	1* GTCS	9mo	Migraine without aura + 2.1	Normal	Normal
22	18	F	5	1* GTCS	1	Infrequent Episodic TTH	Normal	Normal
23	45	F	10	1* GTCS	10	Chronic TTH	Normal	Normal
24	24	F	2	CPS with 2* GTCS	5	Migraine without aura - 1.5	Normal	Normal
25	30	F	2	SPS with 2* GTCS	1	Migraine without aura	Normal	Normal
26	30	M	9	1* GTCS	2	Migraine with aura + 2.1	Normal	Normal
27	35	F	2	1* GTCS	6mo	Migraine without aura	Normal	Normal
28	14	F	3	SPS	9mo	Migraine with aurua	Normal	Normaql
29	36	M	12	1* GTCS	4	Migraine without aura	Normal	Abnormal record

S. No	Age	Sex	Dur yrs	Seizure type	Dur H/A	H/A sub type	CT scan brain	EEG
30	30	F	11	CPS with 2* GTCS	5	Migraine without aura frontal sinusitis	Para nasal sinusitis	Normal
31	39	F	6	GTCS	1	Frequent Episodic TTH`	Normal	Normal
32	21	M	5	1* GTCS	4	Migraine without aura	Normal	Normal
33	26	F	7	SPS	2	Infrequent episodic TTH	Normal	Abnormal record
34	42	F	9	SPS with 2* GTCS	7	Migraine with aura	Normal	Normal
35	16	F	3	GPCS	3	Probable Migraine	Normal	Normal
36	40	F	6	CPS with 2* GTCS	5	Migraine with aura -1.5	Normal	Normal
37	30	M	23	1* GTCS	10	Migraine without aura - 1.5	Normal	Normal
38	21	F	5	SPS	2	Migraine without aura	Normal	Normal
39	17	F	5	1* GTCS	8	Migraine without aura + 2.1	Normal	Normal
40	18	F	8	1* GTCS	9mo	Frequent episodic TTH	Normal	Normal
41	23	F	4	SPS with 2* GTCS	6	Migraine with aura	Normal	normal
42	32	F	5	SPS with 2* GTCS	10	Infrequent episodic TTH	Normal	Normal
43	26	F	7	Tonic Seizures	1	Frontal sinusitis	Normal	Normal
44	23	F	6	CPS	3	Infrequent episodic TTH	Normal	Normal
45	27	F	7	SPS with 2* GTCS	1	Infrequent episodic TTH	Normal	Normal
46	16	F	1	1* GTCS	3	Frequent episodic TTH	Normal	Normal
47	33	M	5	1* GTCS	2	Migraine without aura	Normal	Normal

S. No	Age	Sex	Dur yrs	Seizure type	Dur H/A	H/A sub type	CT scan brain	EEG
48	27	F	5	CPS	2	Episodic cluster headache	Normal	Normal
49	28	F	2	1* GTCS	3	Migraine with aura	Normal	Normal
50	28	F	17	SPS with 2* GTCS	5	Frequent episodic TTH	Normal	normal
51	41	F	25	CPS 2* GTCS	10	Migraine without aura - 1.5	Normal	Normal
52	27	F	5	1* GTCS	10	Migrane with aura	Normal	Normal
53	22	F	4	CPS	10	Frequent Episodic TTH-Chronic TTH	Normal	Abnormal record
54	14	F	2	1* GTCS	3	Migraine without aura - 1.5	Normal	Normal
55	38	F	15	1* GTCS	10	Migraine without aura-chronic migraine	Normal	Normal
56	32	F	12	SPS with 2* GTCS	12	Frequent episodic TTH	Normal	Normal
57	16	F	2	CPS	4	Migraine without aura + 2.1	Normal	Normal
58	24	M	4	1* GTCS	2	Frequent episodic TTH	Normal	Normal
59	29	F	6	1* GTCS	3	Probable Migraine	Normal	Normal
60	17	F	2	GTCS	1	Infrequent episodic TTH	Normal	Normal
61	24	F	4	SPS with 2* GTCS	5	Migraine with aura	Normal	normal
62	10	F	1	1* GTCS	2	Basilar type migraine	Normal	Normal

S. No	*Age*	*Sex*	*Dur yrs*	*Seizure type*	*Dur H/A*	*H/A sub type*	*CT scan brain*	*EEG*
63	35	F	10	1*GTCS	14	Migraine without aura - 1.5	Normal	Normal
64	29	F	2	CPS	3	Frequent episodic TTH	Normal	Abnormal record
65	30	F	5	SPS	2	Migraine without aura	Normal	Normal
66	18	F	4	SPS with 2* GTCS	6	Infrequent episodic TTH	Normal	Normal
67	32	F	11	CPS	6	Migraine without aura	Normal	Normal
68	38	M	14	1* GTCS	10	Frequent episodic TTH + Dental Caries	Normal	Normal
69	42	F	10	1* GTCS	15	Migraine without aura - 1.5	Normal	Normal
70	22	F	2	1*GTCS	5	Migraine without aura	Normal	Normal
71	27	M	7	CPS with 2* GTCS	3	Primary stabbing Headache	Normal	Abnormal record
72	23	F	5	1*GTCS	7	Migraine without aura	Normal	Normal
73	33	F	9	1*GTCS	3	Migraine without aura + Dental Caries	Normal	Normal
74	27	F	10	CPS	5	Migraine without aura - 1.5	Normal	Normal
75	24	F	14	SPS	7	Frequent episodic TTH + Neck Trauma	Normal	Normal
76	29	F	3	1*GTCS	2	Infrequent episodic TTH	Normal	Normal
77	32	F	11mo	1*GTCS	3	Migraine without aura	Normal	Abnormal

S. No	*Age*	*Sex*	*Dur yrs*	*Seizure type*	*Dur H/A*	*H/A sub type*	*CT scan brain*	*EEG*
								record
78	41	F	3	CPS	5	Migraine without aura - 1.5	Old calcified lesion right occipital region	Normal
79	27	F	4	1*GTCS	2	Migraine without aura	Normal	Normal
80	23	F	2	1*GTCS	2	Primary Stabbing Headache	Normal	Normal
81	29	M	7	GTCS	3	Primary Stabbing Headache	Normal	Normal
82	36	F	9	1*GTCS	11	Infrequent episodic TTH	Normal	Normal